AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

What is Claimed:

1.   (Currently amended) A method for identifying an agent capable of enhancing longevity, comprising:

contacting an organism having a deregulated ~~neurotransmitter signaling~~ cholinergic pathway with a test agent, wherein ~~a detectable phenotype~~ increased lifespan is associated with said deregulated ~~neurotransmitter signaling~~ cholinergic pathway;

assaying for the ability of the test agent to ~~effect said phenotype~~ increase the lifespan of the organism as compared to a suitable control,

selecting an agent that increases the lifespan ~~wherein the agent is identified based on its ability to alter said phenotype as compared to a suitable control~~,

to thereby identify an agent capable of enhancing longevity.

2.   (Currently amended) The method of claim 1, wherein said organism further has a deregulated insulin signaling pathway, wherein said ~~detectable phenotype~~ increased lifespan is associated with said deregulated ~~neurotransmitter signaling~~ cholinergic pathway or said deregulated insulin signaling pathway.

3.   (Canceled)

4.   (Currently amended) The method of claim 1 or 2 ~~3~~, wherein said organism has a deregulated ~~neurotransmitter signaling~~ cholinergic pathway molecule selected from the group consisting of a muscarinic receptor, EGL-30 and EGL-8, or a mammalian orthologue of said signaling pathway molecule.

5-6.   (Canceled)

7.   (**Currently amended**) The method of claim 1 or 2, wherein said organism has a deregulated ~~neurotransmitter signaling~~ cholinergic pathway molecule which is downstream of diacylglycerol (DAG) in ~~a~~ said cholinergic ~~or serotinergic~~ pathway.

8.   (**Withdrawn**) The method of claim 7, wherein said organism has a deregulated neurotransmitter signaling pathway molecule selected from the group consisting of UNC-13, PKC, UNC-18, UNC-64, SNAP-25, synaptobrevin, UNC-31, or a mammalian orthologue of said signaling pathway molecule.

9.   (**Original**) The method of claim 2, wherein said organism has a deregulated insulin signaling pathway molecule selected from the group consisting of DAF-2, AAP-1, IRS, AGE-1, PDK-1, AKT-1, AKT-2 and DAF-18, or a mammalian orthologue of said signaling pathway molecule.

10-13. (**Canceled**)

14.   (**Currently amended**) A method for identifying an agent capable of enhancing longevity, comprising:

contacting an organism with a test agent, said organism having a ~~neurotransmitter~~ ~~signaling~~ cholinergic pathway;

assaying for the ability of the test agent to <u>inhibit the cholinergic pathway by monitoring</u> <u>the effect of the test agent on one or more of the expression, intracellular level, extracellular</u> <u>level, activity, post-translational modification, interaction, cellular localization, or synaptic</u> <u>release of</u> ~~affect~~ an indicator of said ~~neurotransmitter signaling~~ cholinergic pathway <u>as compared</u> <u>to a suitable control; and</u>

    <u>selecting an agent that inhibits the cholinergic pathway;</u>
    <u>to thereby identify an agent capable of enhancing longevity.</u>
    ~~wherein the agent is identified based on its ability to alter said indicator as compared to a~~ ~~suitable control.~~

15.   (**Currently amended**) A method for identifying an agent capable of enhancing longevity, comprising:

contacting an organism with a test agent, said organism having a ~~neurotransmitter signaling~~ cholinergic pathway and an insulin signaling pathway;

assaying for the ability of the test agent to <u>inhibit the cholinergic pathway and insulin signaling pathway by monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of</u> ~~affect~~ at least one indicator of ~~neurotransmitter signaling~~ <u>said cholinergic pathway</u> ~~or~~ <u>and</u> insulin signaling <u>pathway; and</u>

<u>selecting an agent that inhibits the cholinergic pathway and insulin signaling pathway;</u>

<u>to thereby identify an agent capable of enhancing longevity.</u>

~~wherein the agent is identified based on its ability to alter said indicator as compared to a suitable control.~~

16.   (**Original**) The method of claim 14 or 15, wherein the indicator is a signaling pathway molecule or a reporter of said molecule.

17.   (**Original**) The method of claim 16, wherein the agent is identified based on its ability to alter expression of said indicator.

18.   (**Original**) The method of claim 16, wherein the agent is identified based on its ability to alter an intracellular or extracellular level of said indicator.

19.   (**Original**) The method of claim 16, wherein the agent is identified based on its ability to alter an activity of said indicator.

20.   (**Original**) The method of claim 16, wherein the agent is identified based on its ability to alter the cellular localization of said indicator.

21.   (**Original**) The method of any one of claims 1, 2, 14 and 15, wherein the organism is a nematode.

22.   (**Original**) The method of claim 21, wherein the nematode is *C. elegans*.

23.   **(Original)** The method of claim 21, wherein the nematode is a parasitic nematode.

24.   **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting a cell with a test agent, said cell having a ~~neurotransmitter signaling~~ cholinergic pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway by monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of ~~detecting~~ an indicator of said ~~neurotransmitter signaling~~ cholinergic pathway; and

selecting an agent that inhibits the cholinergic pathway;

to thereby identify an agent capable of enhancing longevity.

~~wherein an agent is identified based on its ability to modulate the neurotransmitter signaling pathway in said cell.~~

25.   **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting a cell with a test agent, said cell having a ~~neurotransmitter signaling~~ cholinergic pathway and an insulin signaling pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway and insulin signaling pathway by monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of ~~detecting~~ an indicator of said ~~neurotransmitter signaling~~ cholinergic pathway ~~or~~ and insulin signaling pathway; and

selecting an agent that inhibits the cholinergic pathway and insulin signaling pathway;

to thereby identify an agent capable of enhancing longevity.

~~wherein an agent is identified based on its ability to modulate the neurotransmitter signaling or insulin signaling pathway in said cell.~~

26.   **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting a cell population with a test agent, said population comprising a cell having a ~~neurotransmitter signaling~~ cholinergic pathway and a cell having an insulin signaling pathway;

assaying for the ability of the test agent to inhibit the cholinergic pathway and insulin signaling pathway by monitoring the effect of the test agent on one or more of the expression, intracellular level, extracellular level, activity, post-translational modification, interaction, cellular localization, or synaptic release of ~~detecting~~ an indicator of the ~~neurotransmitter signaling~~ cholinergic pathway ~~or~~ and insulin signaling pathway; and

selecting an agent that inhibits the cholinergic pathway and insulin signaling pathway;

to thereby identify an agent capable of enhancing longevity.

~~wherein an agent is identified based on its ability to modulate the neurotransmitter signaling pathway or insulin signaling pathway.~~

27-32. **(Canceled)**

33.　　**(Original)** The method of any one of claims 24-26, wherein the indicator is a signaling pathway molecule or a reporter of said molecule.

34.　　**(Original)** The method of claim 33, wherein the agent is identified based on its ability to alter expression of said indicator.

35.　　**(Original)** The method of claim 33, wherein the agent is identified based on its ability to alter an intracellular or extracellular level of said indicator.

36.　　**(Original)** The method of claim 33, wherein the agent is identified based on its ability to alter an activity of said indicator.

37.　　**(Original)** The method of claim 33, wherein the agent is identified based on its ability to alter the cellular localization of said indicator.

38.　　**(Original)** The method of any one of claims 24-26, wherein the cells are mammalian cells.

39.   **(Original)** The method of any one of claims 24-26, wherein the cells are human cells.

40.   **(Original)** The method of any one of claims 24-26, wherein the cells are derived from a nematode.

41.   **(Original)** The method of claim 26, wherein the cell population comprises presynaptic cells and postsynaptic cells.

42.   **(Original)** The method of claim 41, wherein the presynaptic cells are nerve cells.

43.   **(Original)** The method of claim 41, wherein the postsynaptic cells are nerve cells.

44.   **(Original)** The method of claim 41, wherein the postsynaptic cells are muscle cells.

45.   **(Currently amended)** A method for identifying an agent capable of enhancing longevity, comprising:

contacting an assay composition with a test compound agent in vitro, wherein said assay composition comprises a neurotransmitter signaling cholinergic pathway molecule;

assaying for the ability of the test agent to affect the detecting activity or expression of said neurotransmitter signaling cholinergic pathway molecule;

selecting an agent that inhibits the activity or expression of said cholinergic pathway molecule;

to thereby identify an agent capable of enhancing longevity.

wherein said agent is identified based on its ability to modulate activity or expression of said neurotransmitter signaling pathway molecule.

46-47. **(Canceled)**

48.   (Original) The method of claim 45, wherein said assay composition is a cell-free extract.

49.   (Withdrawn) A novel agent identified according to the method of any one of claims 1, 2, 14, 15, 24, 25, 26 and 45.

50.   (Withdrawn) A pharmaceutical composition comprising the agent of claim 49.

51.   (Withdrawn) A method of enhancing longevity in a subject, comprising:
administering to a subject in need of enhanced longevity a pharmacologically effective dose of an agent that modulates a neurotransmitter signaling pathway molecule;
wherein modulation of said neurotransmitter signaling pathway molecule in said subject enhances longevity.

52.   (Withdrawn) The method of claim 51, wherein the agent modulates expression or activity of said neurotransmitter signaling pathway molecule.

53.   (Withdrawn) The method of claim 51, further comprising administering a pharmacologically effective dose of an agent that inhibits an insulin signaling pathway molecule.

54.   (Withdrawn) The method of any one of claims 51-53, wherein said subject is an aging or aged subject.

55.   (Withdrawn) The method of any one of claims 51-53, wherein said subject exhibits at least one symptom of premature aging.

56.   (Withdrawn) The method of any one of claims 51-53, wherein said subject has an aging-associated disorder.